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10/702,200	11/04/2003	Ryoji Kubo	1232-5191	7121

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EXAMINER	
CUTLER, ALBERT H	

ART UNIT	PAPER NUMBER
2622	

NOTIFICATION DATE	DELIVERY MODE
03/11/2009	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/702,200	KUBO, RYOJI	
	Examiner	Art Unit	
	ALBERT H. CUTLER	2622	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 December 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *16 and 17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *16 and 17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

1. This office action is responsive to communication filed on December 10, 2008.

Response to Arguments

2. Applicant's arguments filed December 10, 2008 have been fully considered but they are not persuasive.

3. Applicant argues that there is simply no teaching in Anderson when and how the color conversion and white balance integration operations are performed. Other than the cited portion which merely describes that the color conversion and white balance settings on the raw image data performed, there is simply nothing in Anderson that teaches that "the white balance integral processing for the second RAW data by said white balance integration device and the color space conversion for first RAW data by said image processing device processes are performed in parallel during reading of the second RAW data from the image sensing element" as specifically required by claim 16.

4. The Examiner respectfully disagrees. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). The combination of Nakamura and Anderson teaches the white balance integral processing for the second RAW data by said white balance integration device and the color space conversion for first RAW data by said image processing device processes are performed in parallel during reading of the second RAW data from the image sensing element. For instance, Nakamura

teaches that the white balance integration is performed during the readout of image data from the image sensor into memory (See column 6, lines 21-26), and that the color space conversion is subsequently performed on image data read out from memory (See column 6, lines 26-36). Nakamura does not explicitly teach first and second areas of memory for performing parallel processing. This is taught by Anderson. Anderson teaches that second image data is read out from the image sensing element and into memory at the same time first image data is read out from the memory for further image processing (See column 6, lines 47-56. Anderson states that "while input buffer A is filled with image data, the data from input buffer B is processed and transmitted to frame buffer B". Anderson teaches that color space conversion is part of the image processing that takes place during the transfer from the input buffer to the frame buffer, column 6, lines 19-32.). Therefore, as Nakamura teaches that the white balance integral processing is performed during the readout from the image sensor and into memory, and the color space conversion is performed during the readout of image data from the memory, and Anderson teaches that the readout from the image sensor to memory and the readout from memory for image processing are performed in parallel, the combination of Nakamura and Anderson teaches that the white balance integral processing for the second RAW data by said white balance integration device and the color space conversion for first RAW data by said image processing device processes are performed in parallel during reading of the second RAW data from the image sensing element.

5. Applicant argues that secondly, the Anderson's so-called ping-pong buffers A, B as shown in Fig. 4B are different from the memory of claim 16. For example, while the memory of claim 16 requires that each of the first and second areas of the memory stores the RAW data from the first and second operations alternately, the input buffers A and B alternate between an input cycle and processing cycle. See, e.g., col. 5, lines 52-53. Continuing portion of Anderson (i.e., col. 5, lines 53-57) further describes that "[d]uring the input cycle, the input buffers 538 are filled with raw image data from the image device 114, and during the processing cycle, CPU 344 processes the raw data and transmits the processed data to the frame buffers 536."

6. The Examiner respectfully disagrees. Although Anderson teaches that during the input cycle the input buffers 538 are filled with raw image data from the imaging device 114, and during the processing cycle, CPU 344 processes the raw data and transmits the processed data to the frame buffer 536, Anderson additionally teaches that buffers A and B alternate between an input cycle and a processing cycle (column 6, lines 4-14), and that while one buffer is in the input cycle the other is in the processing cycle (column 6, lines 47-56).

7. Therefore, the rejection is maintained by the Examiner.

Claim Rejections - 35 USC § 103

8. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

9. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nakamura et al. (US 6,963,374) in view of Anderson (US 6,847,388) and Taniguchi et al. (US 5,619,347).

10. The Examiner's response to Applicant's arguments, as outlined above, in hereby incorporated into the rejection of claim 16 by reference.

Consider claim 16, Nakamura et al. teaches:

An image sensing apparatus ("Digital Camera", figures 1-4, column 2, line 56 through column 4, line 43) comprising:

an image sensing device ("CCD", 303, figure 4) which outputs image data obtained by an image sensing element as RAW data (column 3, lines 50-58);

a memory ("DRAM", 232, figure 4) which has a first area for temporally storing first RAW data obtained in a first image sensing operation of said image sensing device and for temporally storing second RAW data obtained in a second image sensing operation next to the first image sensing operation of said image sensing device (See figure 7, column 7, lines 10-49. First raw image data is written into the DRAM (232) over channel 1. During a subsequent image capture operation, this first raw data is read out of DRAM (232) over channel 2 for image processing, as second image data is written into the DRAM (232) over channel 1.);

a white balance integration device (211a, figure 6A) which integrates at least one of the first and second RAW data for a white balance processing (The white balance integration device (211a) is part of the image signal processor (211, figure 4). The

RAW image data is subjected to white balance processing, and then stored into the DRAM (232), column 6, lines 21-26.);

an image processing device (211, figure 4) which performs image processing of the first and second RAW data readout from said memory (The image processing device (211) performs processing such as color space conversion on the RAW data readout from memory (232), column 4, lines 8-10, column 6, lines 26-36, column 7, lines 24-33.),

a display device (“EVF”, 20, or “LCD”, 10, figure 4) which displays an object image during imaging on the image sensing element (The display acts as a “live view display” (i.e. an object image is displayed during imaging), column 3, lines 16-23.); and

a control device (“main CPU”, 21, figure 4) which controls said memory (232), said white balance integration device (211a), said image processing device (211), and said display device (20, 10, column 4, lines 1-27. The main CPU (21) comprises the image processing device (211) which contains the white balance integration device (211a), a bus controller (218) for controlling the memory (232), and a video encoder (213) which supplies analog image signals to the display.),

wherein, in case said image sensing device outputs third RAW data obtained in a third image sensing operation next to the first and second image sensing operations (See figure 7. Steps 1, 8 and 10-12 comprise a continuous loop. Because of this, it is clear that third RAW data, fourth RAW data, etc. can be output by the image sensing device without altering the camera operation.), said control device (21) controls so that, said image processing device (211) processes a color space conversion for the first

RAW data readout from said memory (232) in accordance with start of exposure/storage of the second RAW data from the image sensing element (303) in the second image sensing operation (See figure 8, column 7, lines 24-33. A frame of raw data obtained by an immediately preceding image (i.e. first image data) is read out of DRAM (232) and subjected to color space conversion while second image data is obtained through exposure and storage of the CCD.), and said display device ("LCD", 10) displays the object image (See "Live View Display" on the right side of figure 8.) after the color space conversion processing for the first RAW data (See "Pc", figure 8) and the integral processing (See Readout 2, "Pe", figure 8) for the second RAW data (See column 7, lines 24-49. The LCD exhibits a "Live View Display" after the color space conversion "Pc" and integral processing "Pe".).

However, Nakamura et al. does not explicitly teach that said memory (232) has a second area for storing the second RAW image data, each of the first and second areas of the memory storing the RAW data from the first and second operations alternately, or that said memory stores the third RAW data in the first area in which the first RAW data after processing of the first RAW data by said image processing device is finished. Nakamura et al. further does not explicitly teach that the processing device processes a color space conversion for the first RAW data readout from said first area in accordance with start of reading the second RAW data from the image sensing element.

Anderson is similar to Nakamura et al. in that Anderson teaches of a camera (figures 1-3) with a memory (figure 4a). Anderson also similarly teaches of reading out raw image data from an image sensor (114, figure 1, column 5, lines 59-64), storing the

data in a memory (530, column 5, line 59 through column 6, line 3), and subsequently performing color space conversion on the image data (column 8, line 59 through column 9, line 7).

However, in addition to Nakamura et al., Anderson teaches that said memory (figures 4a and 4b) has a second area (Input buffer, 2, B) for storing the second RAW image data, each of the first and second areas of memory stores the RAW data from the first and second operations alternately, that said memory stores the third RAW data in the first area in which the color space conversion of the first RAW data by said image processing device is finished, and that the processing device processes a color space conversion for the first RAW data readout from said first area in accordance with start of reading the second RAW data from the image sensing element (See figure 4a, column 4, line 59 through column 6, line 3, column 6, lines 38-56, column 8, line 59 through column 9, line 8. Anderson teaches, “Referring again to FIG. 4B, the ping-pong buffers are utilized during live view mode as follows. While input buffer A is filled with image data, the data from input buffer B is processed and transmitted to frame buffer B. At the same time, previously processed data in frame buffer A is output to the LCD screen 402 for display. While input buffer B is filled with image data, the data from input buffer A is processed and transmitted to frame buffer A. At the same time, previously processed data in frame buffer B is output to the LCD screen 402 for display.” As one buffer (i.e. the second area) is filled with raw image data (i.e. the start of reading of the second RAW data from the image sensing element), the other buffer (i.e. the first area) is emptied and processed (i.e. first RAW data is readout from the

first area), which processing involves color space conversion (See 612, figure 7, column 8, line 59 through column 9, line 8). Anderson teaches that the input buffers A and B alternate between an input cycle and a processing cycle, column 6, lines 8-10. Therefore, buffer A is an input buffer during a first phase, an output buffer during a second phase when second RAW data is written into buffer B, and again an input buffer during a third phase when third RAW data is output from the sensor an into memory. Thus, the third image data is stored in the same area (i.e. buffer A) as the first image data during the third phase, after the first image data is processed during the second phase.).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time of the invention to use ping-pong buffers as taught by Anderson in the camera taught by Nakamura et al. to read out raw image data from the image sensor concurrent with the processing color space conversion of previous image data, for the benefit of improving the display speed of the digital camera and preventing the tearing of the image on the display (Anderson, column 5, line 65 through column 6, line 3.).

Nakamura et al. alone does not explicitly teach that the integral processing for the second RAW data by said white balance integration device and the color space conversion for first RAW data by said image processing device processes are performed in parallel during reading of the second RAW data from the image sensing element. However, because the white balance integration taught by Nakamura et al. is performed during the raw data writing (“Pe”), and thus in parallel with the readout of the second image data (see figure 8, column 7, lines

41-49), the combination of Nakamura et al. and Anderson teaches that that integral processing of the second image data and the color space conversion of the first image data are performed in parallel. This is because Anderson modifies Nakamura et al. such that the image processing of the first image data (which includes color space conversion) readout from the first area of memory takes place concurrently with the readout of second RAW image data from the image sensor (which includes integration) and into the second area of memory, as discussed above.

However, the combination of Nakamura et al. and Anderson does not explicitly teach a white balance calculation device which calculates a white balance coefficient on the basis of the integration result by the white balance calculation, or that the image processing is performed in accordance with the white balance coefficient calculated by said white balance calculation device.

Taniguchi et al. is similar to Nakamura et al. in that Taniguchi et al. teaches performing white balance (column 1, lines 9-15) on image data stored in a picture memory (12, figure 1, column 9, lines 42-60). Taniguchi et al. also similarly teaches of a white balance integration device (15, 16, figure 1, column 9, line 63 through column 10, line 8).

However, in addition to the teachings of Nakamura et al. and Anderson, Taniguchi et al. teaches of a white balance calculation device (“white balance coefficient calculating unit”, 22, figure 1) which calculates a white balance coefficient on the basis of the integration result by the white balance calculation (See figure 1, column 10, lines

45-60. The white balance calculation device (22) calculates a white balance coefficient according to a plurality of factors determined in units 17-21 of figure 1, based upon the white balance integration of the white balance integration device (15,16). See also column 10, lines 6-44.), and that the image processing is performed in accordance with the white balance coefficient calculated by said white balance calculation device (See 14, figure 1, column 9, lines 50-60, column 10, lines 56-60. Image processing is performed by the white balance adjusting unit (14) based upon the white balance coefficient calculated by the white balance coefficient calculating unit (22).).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time of the invention to have the image processing device taught by the combination of Nakamura et al. and Anderson comprise a white balance calculation device and perform white balance processing based upon a calculated white balance coefficient as taught by Taniguchi et al. for the benefit of performing a sufficient degree of white balance adjustment appropriate to a colored picture without any erroneous adjustment or adverse influence due to a high chromaticity region of the colored picture (Taniguchi et al., column 2, lines 40-50).

The combination of Nakamura et al., Anderson, and Taniguchi et al. teaches that said white balance calculation device (taught by Taniguchi et al.) calculates the white balance coefficient for the second RAW data (see above rationale) while said display device displays the object image after the parallel processing of the first and second RAW data. Anderson teaches that parallel processing is performed by utilizing two buffers, column 6, lines 47-56. Anderson teaches that the image data from one buffer is

displayed on the LCD (402) as the image data from the other buffer is processed, column 6, lines 47-56. Therefore, an object image is continuously displayed on the display, including any time when a white balance coefficient is being calculated.

11. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nakamura et al. (US 6,963,374) in view of Anderson (US 6,847,388) and Taniguchi et al. (US 5,619,347) as applied to claim 16 above, and further in view of Sasaki (US 6,961,085).

Consider claim 17, and as applied to claim 16 above, the combination of Nakamura et al., Anderson, and Taniguchi et al. teaches that said display device displays the object image after said white balance calculation device calculates the white balance coefficient (See claim 16 rationale. Anderson teaches of a continuous display.). However, the combination of Nakamura et al., Anderson, and Taniguchi et al. does not explicitly teach a defect correction device.

Sasaki is similar to Nakamura et al. in that image data is collected from the image sensor (12, figure 1), preliminary processing is performed to yield first image data (see step 41, figure 7) which is written into a buffer memory (26a, figure 7). Sasaki also similarly teaches that the first image data is read from the buffer memory (step 42, figure 7) for additional processing (see column 10, lines 1-57).

However, in addition to the combined teachings of Nakamura et al., Anderson, and Taniguchi et al., Sasaki teaches that the apparatus further comprises a defect

correction device which corrects a defective pixel portion of image data when the image sensing element has a defective pixel (See column 10, lines 21-57. Sasaki teaches that the locations of defective pixels are stored in memory, and when reading the data output from the buffer (26a), the defective pixels are corrected.), and that a control device controls said defect correction device in such a way that said defect correction device corrects a defective pixel portion of the image data (See column 10, lines 29-31, lines 37-41.).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time of the invention to have a defect correction device for correcting defective pixels as taught by Sasaki correct defective pixels in the image processing device during the display of the object image as taught by the combination of Nakamura et al., Anderson and Taniguchi et al. for the benefit of keeping the influence of a defective pixel to a minimum and preserving a high-definition image (Sasaki, column 3, lines 1-5, lines 12-16).

Conclusion

12. Any objections previously made by the Examiner to the claims are hereby removed in view of Applicant's response.

13. Any rejections of the claims under 35 U.S.C. 112 previously made by the Examiner are hereby removed in view of Applicant’s response.

14. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ALBERT H. CUTLER whose telephone number is (571)270-1460. The examiner can normally be reached on Mon-Thu (9:00-5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sinh Tran can be reached on (571) 272-7564. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

AC

/Sinh N Tran/
Supervisory Patent Examiner, Art Unit 2622